JANUARY 1986

DRIVER

AFTER THE CRASH

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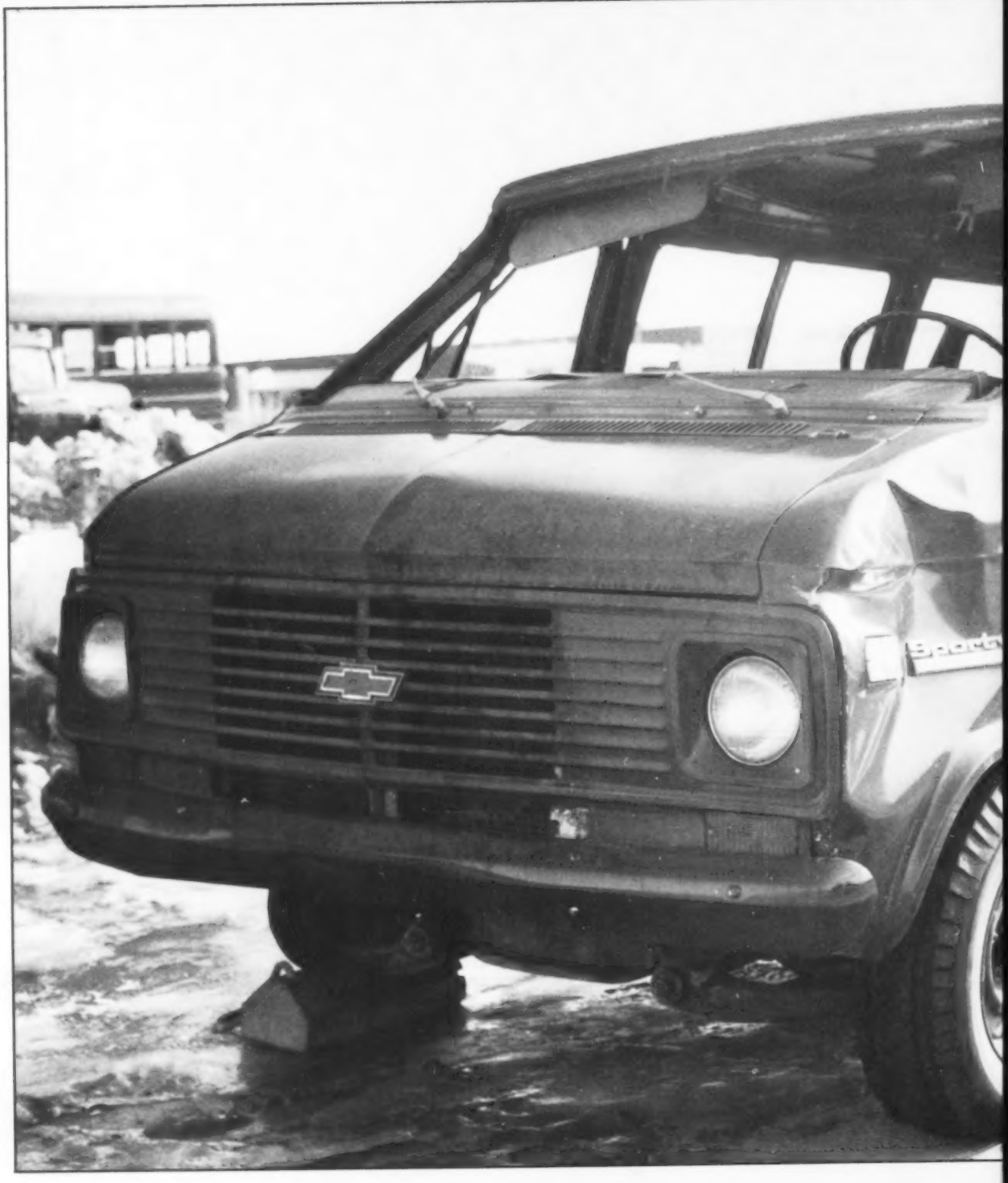

Saved by the

This van was airborne in an accident, and it rolled several times. It was totalled. The occupants received only minor injuries. They were wearing their seat belts. See situation No. 8.

belt

Does it take an actual accident to convince people that their seat belts will save them from death or serious injury?

(Much of our focus is on off-duty accidents, and especially those in which fatalities result. This article examines the opposite situation, on-duty accidents in government vehicles where lives were saved. The key difference in these present examples is the fact that seat belts were used. They do work.)

It's true. Seat belts do save lives, and they do minimize injuries. But only if they're used. How many people use their seat belts? The National Highway Traffic Safety Administration cites an estimate of 14 percent. Other sources give varying figures, but still well below 50 percent.

Despite these figures, we can find many examples of seat belts doing their job, in reports of government motor vehicle (GMV) accidents.

Government regulations state that occupants of government vehicles must buckle their seat belts before the car is put into motion. (Among the regs are DODI 6055.4; T.O. 36A-1-6; and AFRs 127-7 and 125-14, if you're interested.) Obviously, the mere existence of a regulation is no guarantee the occupants of the automobile will comply and buckle up. However, the reg increases the chances, especially when there's a sticker on the dashboard telling the riders to do so.

We're giving you these examples of GMV accidents in the hope that you can learn from the experience other people have had, that personal experience is not necessary.

These examples all have happy endings; the people were wearing belts and suffered only minor injuries or came out completely unhurt. Vehicles can always be repaired or replaced. If people wear seat belts, as were the ones in these accidents, "repairing" those people becomes easier, and "replacing" them is less likely to be necessary.

1. Two airmen were driving in an Air Force pickup truck. They entered a left curve, traveling too fast, and the truck went into a skid. The driver tried to control the truck but failed. It went off the left side of the road and overturned, resting on its top. The cab was crushed. The truck cost $4400 to repair.

Both of the airmen were wearing their seat belts. Neither was injured.

continued

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2. An Air Force sergeant was driving a van with three passengers on a wet road that was too narrow for two-way traffic. As he rounded a bend, the driver was blinded by the sun reflecting off the pavement. He put down his sun visor and put his hand up to shield his eyes. Then he saw a 5-ton truck stopped in the roadway ahead of him. He braked, but it was too late to avoid the truck. The van was smashed at the front on the driver's side. Cost to repair it was $2450.

All four of the occupants wore their seat belts. One passenger was injured, but he missed only two days' work.

3. An airman was driving a 2½-ton refrigeration truck on a highway with two passengers. The driver tried to pass a slower-moving jeep, but the jeep came left across the center line, and the Air Force driver lost control of the truck while trying to avoid a collision. The truck went onto a soft shoulder and rolled. The truck was extensively damaged and required over $11,000 for repairs.

All three people in the truck were wearing belts. The driver received bruised ribs and other bruises and cuts serious enough to lose 13 days' work. One passenger had a bruised elbow and the other had bruises and internal injuries.

4. A technical sergeant was driving a truck with an airman passenger when they accidentally went onto the low right shoulder of the road. The driver, trying to get the vehicle back onto the road surface, over-corrected. The truck went completely across the road and off into the ditch on the opposite side, rolling and landing on its top. The cost to repair was over $5700.

Both members had their belts fastened. The driver suffered a broken knee, and the passenger was uninjured.

5. An Air Force civilian and staff sergeant were in their ambulance with lights and siren on, responding to an accident. They were headed south and came to an intersection with a red light. They pulled into the northbound lanes to go through the intersection. Another civilian, driving in a westbound car, failed to stop for the ambulance and the two vehicles collided in the intersection. The ambulance suffered $1700 damage, and civilian car $3500.

All three people were wearing their seat belts. The civilian ambulance driver was uninjured, and the staff sergeant suffered bruises on his back and cuts on his right foot. The other civilian had body bruises.

continued

6. A lieutenant and a staff sergeant were driving in a van on an asphalt road when they encountered fog and road ice. As they came down an incline, they ran over a patch of ice that caused the vehicle to fishtail. The driver steered into each swerve, trying to straighten the vehicle. He finally lost control of the vehicle and it went down a 30-foot-bank, rolling over twice in the process, and landed right side up (see photos). The vehicle took $2200 to repair.

The two were wearing belts. The passenger suffered a lower back strain. The driver was uninjured.

7. An airman was driving a small pickup truck in the left lane of a divided highway. Another vehicle passed him in the middle lane, and swerved into the member's lane. The member swerved left to avoid a collision, lost control of the pickup and hit the guardrail in the median. The Air Force vehicle was totalled.

The airman, who was wearing his seat belt, suffered a broken nose and a cut lip.

8. Two airmen were driving a van on an icy road when a dog crossed in front of them. The driver steered to the right to avoid it, and applied the brakes. At this time, the left front tire of the car hit an ice rut in the road and it began to skid. The driver steered into the skid, but the ice ruts caused the car to bounce around and the driver overcorrected and went into the opposing lane of traffic. He steered back to the right and the car hit built-up snow on the right side of the road. The car became airborne, and rolled several times on impact. It came to rest upright, with the left rear wheel off and extensive body damage. The vehicle was a total loss (see photo on page 1).

The members had their seat belts on. The driver had a cut on his forehead. The passenger suffered a cut on his right knee and a slight injury to his left ankle.

9. A sergeant was driving in rush hour on a city street that intersected with a highway. He stopped at the stop sign and waited for a space in traffic to make a left turn. When he saw a space, he started the turn, but his vehicle was struck on the driver's side by a car traveling on the highway. The Air Force vehicle suffered $1000 damage.

The Air Force driver was wearing his belt. He suffered bruises over his body and lost four work days.

10. A master sergeant and his civilian passenger were driving on a road in heavy rain. Coming from the opposite direction was a civilian car with its headlights on high beam. The member flashed his lights to get the other driver to lower his beams.

This vehicle rolled over twice after skidding on ice. One occupant had a strained back; the other was uninjured. Both were wearing belts. See situation No. 6.

The civilian car had stopped in the roadway because of poor visibility and was preparing to make a right turn onto a small highway turnoff. As the Air Force car approached, the civilian car started across the center line toward it. The Air Force driver veered to the right to avoid a collision and went off the road. As he swerved back to the right to get back on the road he collided head-on with the civilian car. The Air Force vehicle was a total loss.

The occupants of the Air Force car were wearing belts. The driver had a broken nose and cuts and bruises to the head. The passenger had a concussion and a bruised elbow.

There you have it. We have presented these accidents not to fix the blame on anyone, but to credit a simple harness of nylon webbing with saving a number of lives.

The bottom line is that you owe it to yourself to make use of these devices. And you have nobody to *blame* but yourself if you don't. Try to learn from the experience of others.

Voice of Experience

Experience is one thing, and the examples we've cited are convincing in themselves. But the people who had these experiences — what do they think? Here are a few quotes from people who were "saved by the belt."

A senior airman: "The accident made me a believer that seat belts do save lives. I never really used them too often except in government vehicles. But after this accident, I use them at all times — government and civilian vehicles alike. I can honestly say that seat belts prevented serious injuries."

A recruiter: "I was escorting an applicant to a bus station . . . I noticed a blue truck slowing down in front of me, approaching me in the other lane. The truck took a left turn about 20 feet in front of me. I was wearing a belt, the applicant was not. I am convinced the belt saved me because I felt myself brush across the steering column."

A technical sergeant: ". . . On the way back, I lost control, careened into a ditch, with the vehicle resting on its top. I received a fractured knee, the airman received no injuries at all. I personally feel that if we had not had our belts fastened — both shoulder and lap — we would have encountered great injuries judging by the damage to the truck. I know I will always wear seat belts."

THE NEAR ACCIDENT

Learn from your mistakes — please

Have you ever had a "near-accident"? You *almost* got side-swiped by a truck; you *almost* rear-ended another car; you *almost* collided with a motorcycle at an intersection.

You may or may not have an auto accident during your driving lifetime. But during this same driving career, you will likely be involved in some *near* accidents that end just short of becoming actual mishaps. Not a pleasant thought, especially when you realize that any one of them could just as easily *be* an accident.

These things are nothing to get concerned about to the point of ulcers. After all, they happen to everybody, and they are caused by an endless number of circumstances — a dog runs out in front of you and you are nearly rear-ended as you brake; a car from the opposite direction makes a left turn in front of you . . .

But now we're not talking about the near-accidents caused by other drivers (or Fidos). The only thing you can do to avoid these is to give others all the space you can manage, and be very alert for a way to maneuver around a tight spot. What we're concerned with here are the near-accidents you cause yourself, and what you do about them.

"What do you mean, 'do about them'?" you might ask. "The accident didn't happen — I just go on my way and don't let it bother me."

Well, as we said, don't get an ulcer. But you should think about the "close encounter" itself. You made a mistake and it nearly caused a collision — say for example you emerged very fast from a parking lot and someone had to brake to avoid you. Perhaps it was a one-time-only mistake — not something you do every day. But on the other hand, what if it *was* a thing you do every day, a mistake you make over and over?

If you zipped out of that parking lot after having decided to "take a chance," that's one thing — and a bad one. But if you did it without thinking about it, perhaps that's how you always exit parking lots. And perhaps it's just luck that someone hasn't come close to hitting you before. How's that make you feel?

This is an example of a recurring problem: As a teenager, a lieutenant had failed his first driving test because he failed to look over his shoulder when he was making a lane change. He became conscious of the error, re-took the test and got his license. However, when he relaxed, he forgot. In later years, he was involved in three near-accidents because of this same fault — unconsciously failing to look over his shoulder for a lane change.

What we're leading up to is this: What do you learn from making these mistakes, from the near-accidents you've had? Do you make an effort to correct your driving faults, or do you continue to make them? The near-accident is a bad enough occurrence. But if you repeat the same mistake that leads to the same almost-a-collision, how long do you think it'll be before your luck runs out and you cause a *real* accident?

You can turn these near-accidents into valuable learning experiences that will help you to correct your mistakes. Mistakes of this kind are usually unconscious — you weren't thinking, or you wouldn't have done anything so careless. So it will take conscious effort to correct them.

First you have to discover the cause of the problem. Think about the times you've almost collided with another car. Were the reasons something totally out of your control, like the dog we mentioned, or the maneuvers of another driver? Or were the mistakes your own? If you discover you have almost caused accidents because of some error you make again and again, you must alter your performance *now*.

Once you've become aware of the cause of mistakes, you might need a reminder to keep the fault in your conscious mind. A real collision could remind you, but that defeats the purpose. You know best what will remind you of something you need to recall. Maybe a note taped to the dashboard of the car — "Don't tailgate!" Or a rubber band around your wrist.

What it'll take basically though, is a *change in attitude*. You'll have to tell yourself "I've been doing something pretty stupid and I'll have to change if I don't want to flatten my car, and *myself*." It's the same as with *any* fault — first you become aware of it, and then you change it.

In near-accident cases you *have* to change the fault. The tailgater who keeps telling the same "near-accident" story — "I stopped, I swear, about *three inches* from that guy's bumper!" — will either change or find the guy's bumper in his lap.

IT HAPPENED TO ME

by TSgt. John H. Forbes
Utah Air National Guard

I left the barber's shop about four and headed for home. It was a ten-mile trip, all of it on city streets. I was riding a Honda 350 and wearing fatigue pants, cowboy boots, a t-shirt and a helmet. It was the second month of my senior year of high school.

As I came up to an intersection I saw a car in the lane to my left. The light turned yellow and I knew I was too close to the intersection to stop so I accelerated to go through. As I pulled away from the car beside me a large blue sedan started a left turn in front of me. There was no place for me to go so without even touching the brakes I just stood up on the footpegs, hoping to get thrown clear.

The radiator hit me squarely and I went airborne at a slight angle to my direction of travel. After flying between two signal light poles I landed in the vacant lot on the corner and slid in the gravel for several feet before stopping on my back. My left leg was in a 'Z' or at least it felt like it.

Slowly I flexed my left foot — my toes moved. In relief I shifted my weight and felt the broken ends of my femur rub together. Laying my head back down I stared up at the sky while a crowd quickly gathered around me. A Protestant minister knelt beside me and prayed over me while a passenger from the car that hit me cradled my head in her lap. Quickly a policeman with a motorcycle badge on his collar appeared and asked me some quick questions as the ambulance attendants attached an air splint to my leg.

I stayed conscious the whole time, but in the ambulance I began to go into shock. My teeth chattered and my shoulders shook like I was in a cold wind. The paramedic quickly treated my symptoms and within a few minutes I was in the emergency room of the hospital.

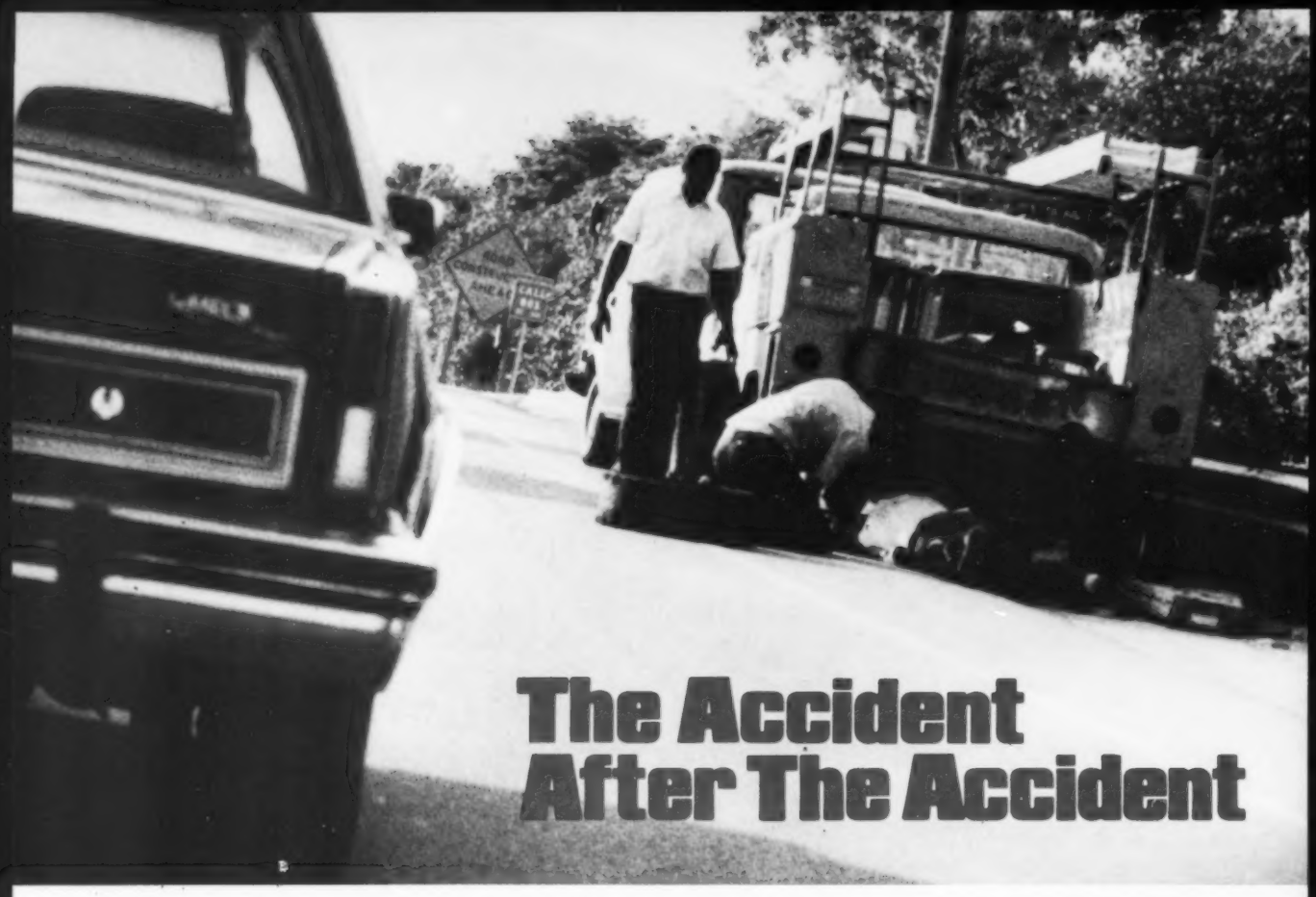
My parents arrived and we spent a few minutes together before I was wheeled into surgery where a smiling nurse stuck a needle into my arm and asked me to count backward from 100. I don't remember reaching 90.

When I woke up the next morning I inspected my leg. It was swollen twice its normal size. Purple and black bruises covered it from my upper thigh to my knee. A foot-long incision was stitched along the line of the cut while a little pus leaked out the bottom of the cut. Carefully, without sitting up completely, I looked around my room. The first thing I reached for was my boots. They were whole. I'd been afraid they'd cut them off my broken leg. (I'd watched too many cowboy movies.) The next thing I picked up was my helmet from the bedside table.

Turning the candy red plastic over I saw a two-inch vertical crack in the center of the forehead that then branched off at an angle for another inch or so. Placing the helmet upside down in my lap I peeled back the inside padding. Sure enough, the crack went all the way through the thick plastic. I looked up at the mirror on the wall opposite me. The lower half of my face had most of the skin scratched off and my chest was lacerated and bruised but looking at the cracked helmet in my lap I was sure glad I had a mean father.

My father had made a deal with me when he let me buy the motorcycle; as long as I wore a helmet I could ride it. I stuck to my part of the deal and so did he, even after my accident.

I never wore that helmet again. But it sat where I could see it for a long time.



The Accident After The Accident

The small European subcompact had damaged itself much more than the full-sized American vehicle it had rear-ended. A young sergeant jumped out of the subcompact and shouted at the man who had stopped so quickly — and without reason — in front of him.

After looking at the damage to his car, the sergeant ran across the other lanes of the divided highway on which they had been traveling. He found a phone booth at the service station and looked up the number of the local police. About that time he noticed a cruising patrol car had already arrived at the scene, and he left the booth to return to the car.

As he recrossed the other lanes, a car moving at 40 miles per hour came over the rise in the road. He had no time to avoid it, and the driver had no time to avoid him. He was struck and knocked over the hood of the car, colliding with the windshield. He landed in the roadway, conscious but unable to move.

Astoundingly, he suffered no broken bones, and no serious injuries, but he was bruised and sore for weeks.

"I didn't even think about any cars," he recalls. "All I was thinking about was getting to those policemen and telling them my side of the story."

Sure it's an odd example, but it happens. People standing on freeways or sitting in their cars after a wreck are sometimes involved in subsequent accidents.

Perhaps it's because people get so agitated after a car mishap they forget where they are, like our friend. Or maybe they subconsciously assume the world stops when something happens to them.

Whatever the reason, a stopped car is a dangerous thing to be around on a freeway.

Another example: A family in Southern California stopped their truck and car by a freeway to work on the truck's air conditioner. The man and woman told their two daughters to get into the car, which was parked behind the truck, to stay cooler. As the parents were working under the hood of the truck, a moving van swerved off the road and struck the parked vehicles. The two daughters were killed and the parents were seriously injured.

This could be a plea to avoid stopping on freeways, and that is of course a good idea. But accidents happen, and cars break down of their own accord. So our point is, if you're stopped on a freeway, *get away from the vehicle*. That way you won't be injured if the vehicle is struck by a passing car. If the car is movable, get it entirely off the roadway, even if the tire is flat and it means ruining the tire. Better a $100 tire than a $5000 automobile.

Use your emergency flashers any time you're stopped. If you have flares or other signaling devices (and you should), use them to alert oncoming traffic that you're having trouble. Or have a lookout down the road to signal them. (If you do this, make sure the lookout is prepared to jump off the road if he sees someone coming at *him*!) Likewise, leave yourself a clear avenue of escape, unhampered by the spare tire and lug wrench. And be prepared to jump if your lookout says to jump!

So if a break-down or accident turns you into an unwilling pedestrian, make the best of it, and practice your walking. But *away* from automobiles.

TRUE ACCIDENTS

Following are a few reports of accidents involving Air Force members. We have removed names and references to dates and places.

DUI

A staff sergeant was driving east in his car on an interstate highway at 0220 hours. Traveling at an excessive speed, the car ran off the road. The staff sergeant lost control and the car collided with a retaining wall. The front end of the car collapsed and the steering wheel struck the driver, crushing his chest. He was dead at the scene. Investigation showed he had been driving under the influence of alcohol.

REAR-ENDED

An airman was riding his motorcycle north on an interstate highway at 2 a.m. He had a second lieutenant riding as a passenger. They exited the highway onto a street, headed east. The airman slowed the cycle, intending to make a U-turn and go west on the same street. Behind them was a car, traveling over 70 mph, operated by another airman who had just exited the southbound side of the same highway. The car driver saw the brake lights of the cycle and slammed on the brakes in an attempt to panic-stop, but was unable to stop in time. His car hit the cycle, throwing both riders off. The cycle operator was wearing a helmet and received minor scratches and bruises. The second lieutenant was not wearing a helmet and she died 45 minutes later. The airman in the car had just left a bar, and his Blood Alcohol Level (BAL) was .17.

HEAD-ON

A staff sergeant, his wife and their infant son left home at six o'clock in the evening to drive to visit the wife's family. They drove south on a divided interstate highway, traveling through the night. At 2:47 the next morning, the wife was driving. She was passing a semi when the car was hit head-on by another auto traveling north in the southbound lanes. Both the staff sergeant and his wife were killed, as was the driver of the other car. The baby, strapped in an infant safety seat, received two broken ankles. The driver of the wrong-way car was drunk — several empty bottles were found in the car — and police estimate he had been driving north in the southbound lanes for seven to eight miles. The semi driver reported the accident happened near the crest of a hill, and he thought it was unlikely either driver saw the other's headlights.

DRUNK

An airman was driving his car on a highway near his base at 1:47 a.m. He had been drinking at a couple of parties, the last a going away party in a base dormitory. On his way to his off-base home, his car went off the road to the right on a right hand curve. It hit a guardrail and a metal light pole. The airman was partially decapitated. His Blood Alcohol Level was .21, over twice the legal level of intoxication.

ALCOHOL AND FATIGUE

A sergeant and a senior airman were traveling north on a wet road toward their overseas base at about 4:15 in the morning. About 12 miles from the base, the road curved to the right and the sergeant failed to negotiate the curve. The car went across the opposing lanes and went up on a guardrail. It traveled along the rail for about 100 yards before going over it. The car hit several trees and turned on its side, finally hitting a tree roof-first and coming to rest upside-down in a ravine. Both men were killed instantly. An investigation revealed the sergeant had probably had only six hours of rest in the previous 48 hours. Both men were seen drinking alcohol about four hours before the accident. Autopsies showed a Blood Alcohol Level of .197 for the sergeant and .220 for the airman.

CYCLE/CAR

A lieutenant was riding his motorcycle on a two-lane mountain highway at 2:15 in the afternoon. He was traveling at least 50 miles per hour, which was too fast for the road. He lost control on a left curve and locked his rear brake attempting to regain control. The cycle skidded across the highway and hit the front of a sedan that was traveling the opposite direction. The lieutenant suffered massive internal injuries and a partial amputation of the left leg. He was dead on arrival at the hospital. He was an inexperienced rider who had not had hands-on training, with a cycle that was not registered on base.

ASLEEP

An airman worked the midnight to eight a.m. shift for five days. Released from duty the next day at one a.m., she drove 50 miles away to visit relatives. She returned to base at 8:30 that evening. A friend visited her in her dormitory from 11:30 until three the next morning. She spoke with friends briefly at 7:30 before again leaving to visit her family. As she was driving north on the highway at 8:25 a.m., she crossed the median of the highway onto the southbound side. A southbound car hit her car broadside. Both the airman and the driver of the other car died. Friends said it was normal for her to sleep only two or three hours at a time. Investigators concluded she had fallen asleep at the wheel.

INEXPERIENCE

An airman was met by a friend at the gym, where he had been working out with weights all afternoon. At six o'clock he drove her to her home, where she was hosting a party. Another friend arrived on his motorcycle and he and the airman stood outside telling riding stories. The cycle owner offered to let the airman ride the cycle, but he declined, saying he was afraid he might wreck the bike. He went inside and talked to the host, telling her he felt "chicken" for refusing the ride. He asked her if he should ride and she said it was up to him. He went outside and borrowed the cycle and a helmet. He rode the cycle out of town for two miles in a 30 mile-per-hour, then reached a 40 mph zone. When he reached a right-hand curve in the road, he lost control. He hit the curb, went up on the sidewalk and hit a metal light pole which was located three feet from the road. On impact he fell off the motorcycle, striking his head on the sidewalk, sustaining serious head injuries despite the helmet. He died three days later in the hospital. He had never attended any motorcycle training of any sort, civilian or military, had no license, and had never owned a motorcycle. He had a history of borrowing motorcycles from friends.

After the crash

Planning ahead is a good idea in any undertaking, from buying the proper ingredients to cook a lasagna dinner to packing all the right gear for a skiing holiday. Advance thinking will spare you a lot of inconvenience, like walking out of the store without the mozzarella cheese, or arriving at the ski lodge with only one pole.

The old slogan "be prepared" has its applications on the side of planning for negative occurrences as well, and here we mean auto accidents. Obviously we hope you won't have any car crashes, and that's what we at DRIVER try to help you prevent.

But they do happen — sometimes despite our best efforts at defensive driving. Here's where the advance planning comes in. If you know what to do after an accident, you can save yourself not only inconvenience but possibly a lot of legal hassles too.

Let's look at a couple of examples. Sgt. X is driving in moderately heavy traffic, smoking a cigarette. He flicks off the ash, and notices that it has missed the ashtray. He takes his eyes off the traffic just long enough to see that it isn't going to set fire to a newspaper on the floor, and plows right into the rear of the car in front, belonging to Mr. S. Sgt. X stops his car and goes to Mr. S's car saying, "It was all my fault. I wasn't watching where I was going." He gets Mr. S's name and his license and registration numbers, and he gives the same information to Mr. S. He checks to make sure no one is injured, and he walks to a nearby phone booth and calls the city police and his insurance company. Then he returns to his car and waits for them.

So what did he do wrong? He shouldn't have said anything about whose fault it was. He may learn later that Mr. S had actually contributed to the accident

Avoiding accidents is the only way to go. But what about when your number's up? What do you do afterward?

through some error such as improper lane change.

Yes, we realize it may be obvious to some of you. But everyone reacts differently to stress situations — some think clearly and some don't. Unless you've been in a number of accidents — and we hope you haven't — you don't know how you'll react. So it's best to be prepared with a list of what to do. And what not to do.

How about another example? TSgt. Z has the green light at an intersection. As he goes through, a car from the cross street runs the red light and they collide in the middle of the intersection. TSgt. Z jumps out and shouts at the other driver. While they are arguing, the only other witness to the crash drives away because he is late to a meeting.

Now, it it comes down to the authorities taking the word of TSgt. Z over the other driver, there will be no witness to back the sergeant up. His reaction — anger — may have been natural but it ends up costing him a lot of money. It wasn't enough to be in the right; he also has to prove it.

So enough with the bad examples; let's get on to the right way.

STOP

The authorities agree that the first thing you must do is stop. They have a nasty name for those who don't stop — "hit-and-run-driver." You should stop at or near the accident site itself, taking care not to impede traffic if possible.

WARN TRAFFIC

The other traffic on the road is the next thing to keep in mind. If the accident is in a hazardous location, like at an intersection or on the freeway, you must alert the oncoming traffic of the mishap. Road flares, if you have them, are good for this purpose, or you might station someone down the road to signal oncoming drivers. If you can, get the vehicles completely out of the way.

continued

Be sure to get the name, insurance company and related information from the other driver, even in the case of a relatively minor accident such as this one.

continued

Arguments about who was at fault are pointless and they can lead to fights, or at least to someone saying something he shouldn't. It is best to say nothing about fault to anyone except the police and the insurance man.

FIRST AID

Next, see if there are injured people involved, and give them what assistance you can. You should check on the injured *first* if the accident has occurred in a non-hazardous location.

If the vehicles cannot be moved, get the people out of them so no one will be injured further if more cars become involved. However, remember that it may be more dangerous to move an injured person than to leave him where he is, depending on the nature of the injury. If his life is endangered by leaving him, move him.

CALL THE LAW

This done, you should notify a law enforcement agency about the accident. This should be done even in the case of a minor fender-bender. When you call be sure to give the officers all the information they will need to respond to the accident. Tell them the location of the accident, tell if the road is blocked, if there are injured people, etc. This way, they will know what equipment is required — fire trucks, ambulances, or whatever.

If you are a witness reporting the accident to the police be sure to give them all the details about location and any assistance required.

It may be necessary for you to leave the scene to call the authorities if, for instance, a bystander is not available and the accident is in a remote area. If you leave, be sure to give the other driver your name, address, driver's license number, and vehicle license number (plus the name of the registered owner of the vehicle, if you have someone else's car). This will insure that you are not charged with being a hit-and-run driver, should something delay your return.

And while you're at the phone anyway, it's a good time to call your insurance company. Give them all the details they ask for.

INFORMATION

After you return to the scene, you should stand by for the police officers to arrive. While you are waiting, you can exchange the personal information with the other driver, if you have not already done so — names, insurance companies, telephone numbers, license numbers and the like. If there are witnesses who cannot stay, get their names and phone numbers so they can be contacted later.

When the officers arrive, provide them with your driver's license and vehicle registration. They will ask you and the other driver for statements of what happened. They can also tell you about other legal requirements you must meet, if any.

At this time, you should tell the officers your preference in towing service, if your car must be towed away.

Each state will have its own law about the requirement for insurance coverage. For instance, in California the drivers must supply each other with proof of insurance if there is over $500 in damages, or if there are injuries.

NO FAULT

An important thing to keep in mind is not to discuss the details of the accident, or the fault, with anyone other than the police. Tempers are likely to be hot and it is best not to talk to the other driver except to exchange names and insurance companies and to render assistance. A representative of the California Highway Patrol told DRIVER, "The less contact you have with the other driver, the better."

CALM YOURSELF

Also, you're likely to be more than a little uptight. An auto accident, even a minor one with no injuries, is no small thing. So nervousness is natural.

But you must remain as calm as possible so you can remember what to do. Here, a written reminder may come in handy. Some insurance companies, and organizations like the National Safety Council and the American Automobile Association, have pamphlets that tell you what you should do and when. Get one and keep it in your car at all times, just in case.

JUST THE FACTS, MA'AM

Certain facts may be helpful to you, if legal action results from the accident. You should get this information after any accident to be on the safe side:

- **Other drivers** — Name, address, phone number, driver's license number, state and expiration date, insurance company, policy number, date.
- **Other vehicles** — Description, registration number, license plate number and state, location and amount of damage, names, addresses and phone numbers of occupants.
- **Injured people** — Name, address and phone number, where taken for treatment, time ambulance arrived, name of ambulance company.
- **The accident** — Location of accident, date and time, weather and highway conditions, diagram of accident site showing position of vehicles before and after and traffic control devices, description of anything else involved, such as animals or property, details of what happened including contributing circumstances.
- **Witnesses** — Names, addresses, phone numbers, their comments (if possible, get signed statements).
- **Police offices** — Names, badge numbers and department, investigation case number.

That may seem like a lot, but it doesn't take that long to get the information, and you may very well need it.

So plan ahead. It's for your own protection.

On the phone, give the police all the details of the accident so they'll know what to bring when they come, if the accident is serious enough to warrant their response.

The Motorcycle Safety Foundation presents
RIDING AND S
COMING SOON!
Kawasaki

TREET SKILLS

Riding and Street Skills can be tailored to your needs, schedules and facilities.

Riding and Street Skills is a truly new approach to rider training.

Riding and Street Skills is more in tune with your needs.

Riding and Street Skills is more effective at preparing beginning riders with the skills they need on-street.

Riding and Street Skills uses less time.

Riding and Street Skills can be tailored to your needs, schedules and facilities.

Riding and Street Skills recognizes that a rider's learning doesn't end with the completion of just one course.

Riding and Street Skills is a *refinement* of the Motorcycle Rider Course (MRC) that has been the mainstay of Motorcycle Safety Foundation (MSF) activities for 10 years.

Riding and Street Skills has a core of 15 hours of instruction; seven in the classroom in preparation for eight hours of range activities.

Riding and Street Skills first level is *Riding* skills with classroom and range activities designed to give you an overall understanding of motorcycling and prepare you with basic *Riding* skills. The building blocks are:

- **Riding in a straight line;**
- **Turning;**
- **Shifting;** and
- **Braking.**

Riding and Street Skills second level is *Street* skills where basic riding skills are applied to on-street conditions. Classroom and range activities are directed towards preparing you for riding on-street in traffic, to prevent crashes and avoid collisions.

Riding and Street Skills has an end-of-course test as a final display of your skills as a rider.

Riding and Street Skills includes five new films and three new slide/tape programs. To quote one early attendee, "The films are worth the price of admission alone!"

Riding and Street Skills first level includes 14 exercises that address the basic skill of straight-line riding, turning, shifting and braking.

Riding and Street Skills second level includes seven exercises and a skill test that address the critical skills of emergency braking, swerving and cornering.

Riding and Street Skills, when compared to the old MRC, according to Doug Fitts, MSF Training and Development manager, "is like comparing a Goldwing to a Ninja. They are both motorcycles. Both do a great job. But they are conceptually different."

Riding and Street Skills has a total of 21 range exercises and an end-of-course evaluation. The old MRC had 43 range exercises.

Riding and Street Skills has five optional modules:

- Practice and Remediation
- Increasing skills
- First Level Evaluation
- On-Street Training
- Inspection and Care

Riding and Street Skills devotes more riding time to braking and turning than the old MRC.

Riding and Street Skills has only three exercises in common with the old MRC.

Riding and Street Skills will be taught to the Air Force's MSF chief instructors at Mather AFB, Calif., during March. Then the other instructors will be updated regionally during the year.

Riding and Street Skills; look for it at your location soon.

THE MORE YOU KNOW THE BETTER IT GETS

MOTORCYCLE SAFETY FOUNDATION

FOR THE RIDER COURSE NEAREST YOU CALL TOLL FREE:

800-447-4700

HOW TO SELECT A SAFETY HELMET

A safety helmet is not a one-time purchase and will bear the effects of regular use not unlike the tires on your bike. A helmet should be replaced or manufacturer-reconditioned within 2-5 years of age, but especially after it has been involved in an accident. So if you're still wearing the trusted helmet that helped save your life, here are some tips on purchasing a replacement.

- Look for the SHCA Quality Assurance sticker to be sure your helmet has met recognized standards for quality and safety. (A list of SHCA member manufacturers may be obtained by writing: Safety Helmet Council of America, 9841 Airport Blvd, Suite 710, Los Angeles, CA 90045.)
- Do not base your purchase decision on the cost of the helmet. In other words, don't decide against purchasing a helmet that is on the low end of the price scale OR don't decide to purchase a helmet just because it is the most expensive. There are more crucial factors to consider when purchasing a helmet than its cost.
- One of the most important factors to consider when purchasing a helmet is the fit. If a helmet does not fit your head properly, it cannot perform the job it was designed to do to the best of its ability. In order to protect you, it must stay on your head. So insist on proper fit and don't get caught with your chin strap dangling.
- If you decide to modify your new (or old) helmet in any way, keep in mind the following:
  - — Paints, solvents, adhesives and many other substances can severely damage the resistance factors of a helmet.
  - — Attachments to your helmet could, in case of an accident, cause the helmet to catch on the roadway.
  - — Contact the manufacturer first if you have any modification questions.

Other ways to insure your helmet remains in top condition include keeping it away from gasoline which, like paints and solvents, can damage the protective shell as well as the liner of a helmet.

In summary, buy a quality helmet, take care of it, and wear it every time you ride! (Safety Helmet Council of America)

BACK-SEAT PASSENGERS SHOULD BUCKLE UP

Seat belt usage may be as important to back-seat passengers as it is to drivers and front-seat passengers, according to accident data from the United Kingdom. In 1984 fatal and serious injuries to rear-seat riders rose seven percent, while similar injuries to front-seat occupants fell by 19 percent. These figures are compared with those from 1982, the last full year that British motorists weren't required to wear seat belts.

AUTOMOTIVE ANTI-THEFT DEVICES

As the number of stolen vehicles continues to rise, more car owners are purchasing auto security devices. Forecasters estimate sales of auto security devices will reach $200 million dollars in 1986. Many theft-deterrents cost under $50, require little professional assistance and provide good protection from professional car thieves. The Automotive Information Council (AIC) provides the following overview of the most common auto security devices:

Traditional auto alarms usually scare away even the most daring car thief. In most systems an opened door, trunk or hood will activate a wailing siren or blaring horn. Other alarms sound when a special device is not deactivated by the car owner upon entering the vehicle. These more elaborate (and more expensive) systems often have special digital keypads or accompanying beepers which the owner carries in a purse or pocket.

A motion detector sounds an alarm when, for example, a vehicle is lifted in an attempt to steal the tires. Glass breakage detectors are also available.

Another popular anti-theft device is a hidden "kill switch." When activated, this device prevents the engine from running for more than a few seconds at a time, bringing attention to the stalled vehicle and a would-be thief.

Hood and trunk locks are also good theft deterrents. Without them, a skilled thief can deactivate most auto alarms or engine cut-off switches in seconds. Special locks are also available for the ignition, steering wheel, brakes, car stereo and wheels.

Etching the car's vehicle identification number (VIN) on each window or on metal body parts can be an effective security measure because a thief would have to replace or discard them before selling the car or its parts. Most thieves will think twice before stealing such a marked vehicle.

REDUCING THEFT

Secretary of Transportation Elizabeth Dole has announced a new standard designed to reduce motor vehicle theft in the United States. The rule requires auto manufacturers to develop a marking system for the major parts of frequently stolen passenger cars.

Many cars stolen in this country are cut into parts that are subsequently resold to repair shops. Once these parts are separated from the vehicles, law enforcement officials can no longer establish that the parts were stolen.

The new standard, issued by DOT's National Highway Traffic Safety Administration (NHTSA), becomes effective in the 1987 model year. It is required by the Motor Vehicle Theft Law Enforcement Act, signed by President Reagan in October 1984.

The final rule reflects NHTSA's review of more than 240 comments to its notice of proposed rulemaking published

timely

on May 10, 1985. Comments were submitted by vehicle and parts manufacturers, law enforcement groups, insurers, automobile dealers, members of Congress, direct importers of vehicles and individual consumers. Direct importers are individuals and commercial companies who obtain foreign cars not originally manufactured to meet U.S. safety and emission standards. The cars, commonly referred to as "gray market" vehicles, are brought into the United States under bond, and modified so they can be certified as meeting all federal standards.

The theft prevention standard requires that the vehicle identification number (VIN) be inscribed or affixed on 14 major parts of certain new cars. The parts include the engine, transmission, right front fender, left front fender, hood, left front door, right front door, front bumper, rear bumper, left rear quarter panel, right rear quarter panel, the decklid (the tailgate or hatchback, whichever is present), and both rear doors in 4-door vehicles. Companies which previously have been marking engines and transmissions with a VIN derivative may continue to do so. Manufacturers will only be required to mark 12 parts in 2-door vehicles.

Replacement parts for the 14 major components covered by the standard will be required to be marked with the letter "R" and a manufacturer's logo.

The new rule sets special requirements for direct imports of vehicles in high theft lines. Such vehicles must be marked with the Euro-VIN, and not a "homemade" U.S. VIN; must have the required parts marked by inscription, rather than by label; and must be marked before the vehicle is imported into the U.S. These provisions enhance the law enforcement aspect of the statute.

AIR BAGS IN 1986

Ford Motor Company will offer a supplemental driver-side air bag system as an option on the 1986 Ford Tempo and Mercury Topaz four-door sedans starting with March production. The air bag system will have a suggested retail value of $815, and it is to be used as a supplement to the basic safety belt system. Driver-side air bags will become standard equipment on all 1986 Mercedes-Benz models, also part of the company's supplemental restraint system package for front seat occupants.

AUTO LOAN MATURITY GROWS

A decade ago, new loans average maturity rate was about three years. In 1985, it grew to more than 4.25 years. The average amount financed for a new car in 1975 was just over $4,000. Monthly payments were averaging $133 a month. Presently, the average amount financed for a new car is over $9,500, with average monthly payments of about $238 a month. As new car prices rise, banks and other loan institutions have been stretching loan maturities to keep down monthly payments.

BUILT IN TIRE PRESSURE GAUGE

For drivers who never check their tire pressure until they have a flat, Michelin Tire Company has developed a system than informs the driver of the pressure and temperature of each tire and monitors the tire conditions by miniature radio transmitter-receivers on the wheel mount. The data is relayed to a digital read-out on the dashboard and alerts the driver to improperly inflated tires which can cause premature tire wear, poor gas mileage and poor handling.

DEPENDABILITY TOP CONSUMER CONCERN

The results of the J.D. Powers Automotive Consumer Profile survey of 5,000 driving-age consumers indicated that dependability is still the chief concern in the vehicle purchase decision. The survey respondents were asked to rank how important 11 vehicle attributes will be in deciding on their next automotive purchase. Of the 11 traits, which included acceleration, availability of parts and service, dependability, fuel economy, maintenance cost, manufacturer's reputation, purchase price, quality of workmanship, resale value, warranty, and safety, more than half (55 percent) of all the consumers rated dependability as being extremely important, followed by workmanship (46 percent) and safety (43 percent).

TOP FIVE CAR COLORS

According to an annual survey of leading car colors by the DuPont Company, Red-brown was the most popular finish in the 1984 model year. Nearly 20 percent of leading 1984 domestic models were purchased in various shades of red. White was the second most popular color (12.6 percent), followed by dark blue (12.4 percent), light blue (9 percent) and silver (7.8 percent).

TWO CITIES TO TRY IGNITION LOCKS

USA TODAY reports a device that keeps a drunk from starting his or her car will be tried on repeat offenders in two California cities.

"If he's had more than two beers, he probably won't be able to start the car," said El Monte Municipal Judge J.B. Casas Jr., who will use the device for people convicted of drunken driving twice in a year.

Monterey Municipal Judge William Burleigh recently ordered the devices installed as a condition of probation for three repeat drunken drivers.

The Stay Alive System — a computerized ignition lock device wired to the starter — measures blood-alcohol level. The driver blows into it for five seconds. If it measures a blood-alcohol level above .04 percent, the car won't start.

It was invented by Jack Simon of Carmel Valley and is marketed by Stay Alive Systems of Pacific Grove. Cost: $300. The first models were donated to the courts.

topics

This is another in a series of articles about driving conditions at ATC installations.

Driving At Vance

by AIC Ron Dunn
Vance AFB, Okla.

Vance Air Force Base, Oklahoma, is a small government-contracted Undergraduate Pilot Training base three miles south of Enid, a town of about 60,000 residents, and about 85 miles northwest of Oklahoma City.

The base population averages around 1,300 military, an equal number of civilian employees, and 3,200 dependents. With such a small population and the size of the base, drivers aren't presented with many difficult traffic conditions. There are only two entrance gates, so the main traffic problem that drivers might encounter at Vance is a slight delay in getting on and off base during rush hours.

With most facilities on base within 10 minutes walking distance from anywhere on base, a lot of pedestrian and bicycle traffic is common. There are areas of the base without sidewalks so both pedestrians and drivers must be cautious. The speed limit on base is 25 miles per hour in all areas other than family housing, where the speed limit is 15 mph. With the 25 mph speed limit and the relatively small amount of traffic, yield signs are more common on base than stop signs and there are no traffic lights on base. Also, there is a lot of construction going on at Vance, causing some parking problems and adding to the number of vehicles on base. As on all bases, drivers are required to wear their seat belts and the security police conduct random seat belt checks.

Driving conditions off-base are a little more tricky. The surrounding area produces wheat and oil. There is a lot of flat, open farmland. The roadways, which are mostly two lane roads, are laid out with a four-way intersection approximately every mile. Back roads are often used by large farm equipment found in the area. During the harvest season some areas become impassable to the ordinary motorist because of heavy equipment traffic. There are a lot of young farm machinery operators, often only 16 or 17 years

old and inexperienced driving on public roads. Farm equipment travels slowly and a driver new to the area should be warned about how quickly a car traveling at average speed can overtake — and crash into — such machines.

Motorists should also look out for animals along the roadway, particularly large farm animals. Many of the back roads are very dark at night. A large steer can step onto a road before a driver notices it. Striking such an animal would be damaging to most cars, not to mention the animal.

Oklahoma has relatively mild winters with very little snowfall, but very high winds and freezing rains that can cause hazardous icing on roads. Due to the small amount of snowfall, there is little snow removal equipment in the area. The weather in the area is subject to sudden change with heavy rain and wind storms, very severe at times, making driving conditions extremely hazardous.

There are a lot of railroad crossings which are infrequently used. Drivers usually don't anticipate trains crossing in the area. However, one should look both ways before crossing train tracks. Some of the crossings are in various stages of deterioration. Some are quite bumpy. Drive slowly over these crossings to avoid damage to your car.

(facing page)
Vance is a small base with practically everything within 10 minutes walking distance, so there is a lot of pedestrian and bicycle traffic on base.

(top right)
Vance has several one-way streets. Yield signs and stop signs are used because the small amount of traffic on base doesn't warrant lights.

(center right)
The main traffic problem at Vance is rush hour at the base's entrance.

(bottom right)
Most of the parking on base is angular parking and calls for care backing into traffic.

USAF photos by Candy Tate

TWICE ALIVE

by PFC Gregory C. Hurley, USA
Fort Polk, La.

We were headed home when it happened. We live about three miles past that curve.

I got off work early that Wednesday. I'd gotten my hair cut, gone to the gun shop — deer season — gone home to pick Benita up, came back, and went to the bank. After we got back from the bank, we were headed home, talking about deer season. Benita was complaining because I'd spent seventy bucks, you know.

We were coming up the hill, it was raining and it was dark, about 6:30, something like that. Benita had just said to me: "Slow down a little bit more."

So I was downshifting into third gear, and I was going between 15 and 20 mph. The way we were going, the road slants from the left to the right and all the water poured across the road — just perfect for hydroplaning. In that curve, you almost have to make a right turn. That's a 25 mph curve at its best, but in the rain, in the dark ——?

Anyway, I had just looked at the speedometer when Benita screamed. When she did, I looked up and in that split second I saw that gold Nissan 300 ZX sliding sideways around that curve. He was only 50 to 70 feet from us. I hit the brakes. We hit. It knocked Benita unconscious and I was kind of in and out. I turned the car off and put the keys in my pocket. Guess I was unconscious for a while.

Then the rescue squad, ambulance, and fire department got there and got us out of the car. My wife's door would not open because we hit more on her side than straight on. The seats were ripped loose from the floor; the engine broke through the firewall and was up underneath the dash inside the car. The radio flew out and hit her. My face hit the steering wheel, broke my nose, got this laceration under my eye, and cut my lips.

My door flung open, jammed open they said. They tell me if I hadn't had my seat belt on I would have gotten flung out of the car and one of the two cars would surely have run over me.

From what they tell me, the other guy did not have his seat belt on. He was thrown into the other side of the car and back out onto the road. That was it.

They worked on us here at the hospital until 11:00. From what I've heard, they didn't expect my wife to live. She was on the critical list for awhile. She ended up with a broken collar bone, three broken ribs, a punctured lung, a broken arm, and a broken ankle. I ended up with a broken hand, a broken knee, and the broken nose and lacerations. My wife still doesn't remember much of what happened that day.

You know, if we had been two seconds later, that guy would probably have been in the ditch. If we had been two seconds earlier, we would have been around that curve. But, I remember that night, when the chaplain came in, my wife said to him, "God didn't make us wear the seat belts." And the chaplain said, "No, but He gave you the opportunity and they were there."

How do I feel about seat belts? The same way I felt about them before: WEAR 'EM.

We started wearing them when we were married six months ago. We got a diesel car, an '84 Chevy Chevette, and when you turn it on, there is a little sign that says, "WAIT" till the car can warm up before you start it. We got into the habit, when that sign was on, of putting on our seat belts. I know my mom's preached to me about it all the time — wear your seat belt, wear your seat belt, wear your seat belt. In fact, we've discussed it, Benita and me. If we get in the habit of wearing it, our kids see us do it, they'll do it; if they do it, their kids will do it. Make it a family habit.

Strange what you don't remember. Seems I was up trying to direct traffic — telling people where things were in the car to make sure they got out. And my deer rifle was all busted up — that's the thing — my deer rifle. But, I'd rather have a busted deer rifle than not be here to use it. Now, I got another year.

My wife was in a car accident years ago, when a tire blew out. She doesn't remember that either, but she came out with just some scratches. She had her seat belt on then, too.

THE POWER FACTOR

P(otential) = C(urrent) X V(olts)

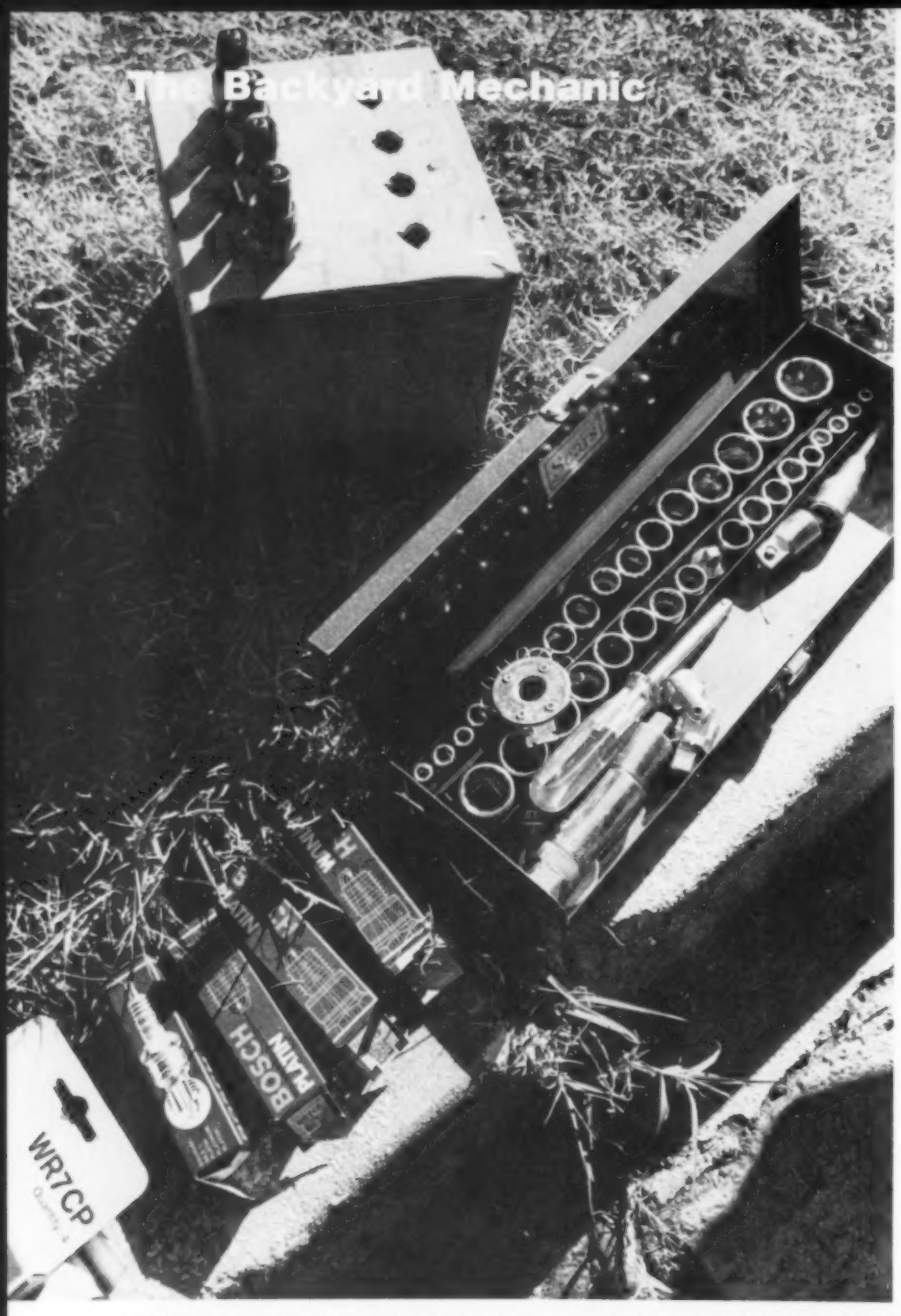
by SSgt. Randall Russ
Shaw AFB, S.C.

For all you backyard, do-it-yourself mechanics, here is a short course on basic electricity safety you need to heed. The little "zap" you can sometimes get working around the wires under your car's hood can't really hurt you — right? (It's only 12 volts, right?) Wrong! What can hurt is how much of that power is released. It's really a factor of the current, and what is conducting that current. In other words, let that voltage flow with a good conductor like that jewelry they tell you not to wear, and you've got a lot of potential — up to 720 watts, to be exact.

Here's the story of what happened to me — and how I learned more about basic electricity than I really cared to. It was one of those simple jobs — just taping some exposed wires that were a result of adding extra instrument gauges (water temp, amps, oil pressure) to my "classic" 69 Ford. A simple job, and certainly not one I would classify as dangerous, even though the wires were hot. Now, I know that the really safe way to work around wiring is to have it disconnected from the power source, and I know better than to wear jewelry and junk while working under the hood, but I let two things sucker me in — the simplicity of the task and the lack of proper respect for the battery's potential. Such is the faith in insulation. Such is ignorance.

In point of fact I was setting myself up. Although the battery's energy is normally safely contained and controlled, it is ready to give up that energy whenever called on — and it will do so in direct proportion to how well what comes in contact with it is able to conduct that energy. And there I was happily taping away when my hand contacted one of the exposed wires. The result was instant and dramatic. There was a pop, a spark, and the smell of something burning. Something unpleasantly burning — my skin! My reaction was fast, but you just can't move faster than that electricity, and I was definitely zapped. Now I've been shocked before, but this was different. This hurt, and it kept hurting even after I had jerked my hand free. Then I realized what had happened. My hand hadn't touched the wire. It was my wrist watch's metal band that had made contact with the wire. A *good* conducter, the watch's metal band had sucked up that energy as fast as the battery and wiring could dump it — 720 watts worth. The metal was so hot it was literally burning into my skin!

The medics at the base hospital's emergency room did a good job fixing up my wrist, and the pain finally started to ease after awhile. But the lessons I learned that day will stay with me. I learned a lot about the physics of my vehicle's electric power source and have a *lot* more respect for it now. But the main point is that now I know why the real pros remove jewelry, including things like watches, when working around any electrical wiring. I'm a little bit smarter now, and a lot safer.



In addition to a wire feeler gauge/tool and spark plug socket wrench you'll need new spark plugs of the proper size and a good tune-up specification manual.

Putting Spark Back Into Your Engine

Spark plugs should be changed at least every 10,000 miles (or annually) or whenever your vehicle shows some tell-tale signs such as:

- Poor acceleration
- Poor fuel mileage
- Hard starting
- Frequent stalls
- Missing

Changing spark plugs is not difficult, but it does require careful attention to details and the use of the best replacement parts available. A few tools will also be necessary.

Why change spark plugs every 10,000 miles when they aren't worn out? Because of some very good reasons based on sound performance principles that have been developed from extensive testing and research programs.

The 10,000-mile figure represents a point beyond which spark plugs are likely to misfire during peak voltage demands such as sudden acceleration. Misfire will cause a loss of power and fuel economy. Also, worn spark plugs contribute to starting failures, a problem which is compounded by wet or cold weather.

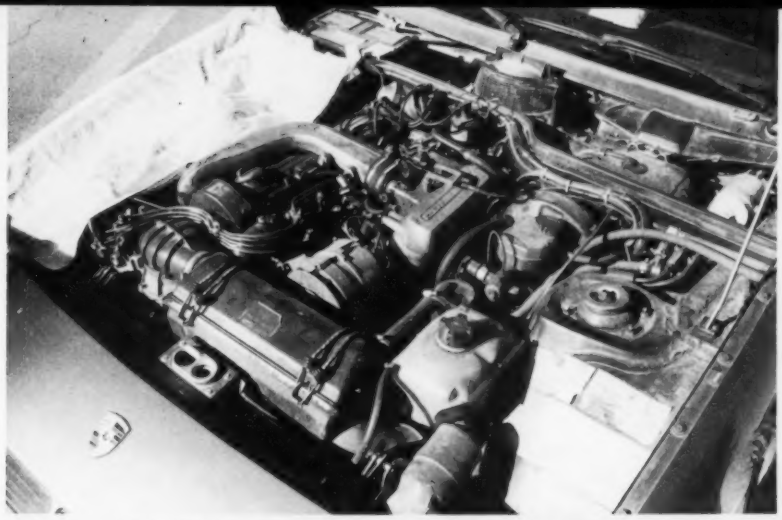
The 10,000-mile plug change recommendation was developed for cars equipped with conventional, breaker-type ignition systems. Electronic systems do eliminate certain maintenance factors, but they do not change the environment in which the spark plug must exist. High combustion temperatures, chemical attack and high voltage discharges determine the service life of the spark plug.

A spark plug must be replaced when it is worn to the point that misfire is likely. Misfire doesn't mean the plug doesn't create a spark. It means that proper ignition of the fuel/air mixture fails to occur whether a spark was produced or not.

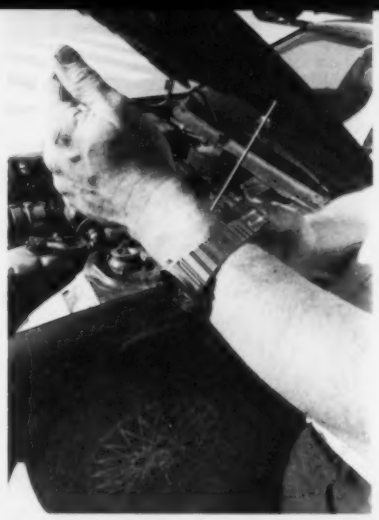
For example, spark tracking through conductive deposits on the plug firing end can result in a weak spark which might fail to initiate proper combustion. Aside from a loss of power, fuel economy suffers and a charge of unburned fuel escapes into the atmosphere to become part of the air pollution problem.

With use the electrode gap widens and the electrodes wear, becoming rounded and uneven. As the gap widens, the voltage required to fire the plug increases until the requirement exceeds the available voltage. The result is once again misfire.

Half of the service calls made are to assist in starting cars. According to one survey, three out of every 10 cars suffer at least one "won't start" situation annually.



Because you'll be working over the fenders, place an appropriate cover over them to protect the painted surface from scratches and scuffs.



Remove all jewelry before starting work.

You'll usually find the correct gap setting as well as the recommended type spark plug listed on this label under the hood. If not, the information is also in your owner's manual or in a good shop manual.

Remove the spark plug wires one at a time. Pull each wire off by grasping the boot that fits over the spark plug (do **NOT** pull directly on the wire or you could damage the wire) and pull with a gentle twisting motion.

When a car won't start, most drivers blame the battery. However, many starting failures can be traced to problems in the ignition system with worn spark plugs being a major contributing factor.

What can new spark plugs do for your car? In a recent test, new plugs alone reduced hydrocarbon (HC) emissions, at idle, an average of 24.33 percent and improved fuel economy an average of 3.44 percent.

(For the record, almost 79 percent of all the cars checked had deficiencies adversely affecting fuel economy, emissions or performance. Following complete tune-ups, there was an average 45.37 percent reduction of carbon monoxide at idle, HC emissions at idle were reduced 55.5 percent and fuel economy was improved 11.36 percent.)

The spark plug is a remarkable product. Because it is positioned in the combustion chamber, it is exposed to the extremes of hot and cold temperatures, attacks of chemicals from fuels and oils in a corrosive atmosphere, and the hammering pressures produced by the piston.

A spark plug has a center electrode that is insulated from the shell by a ceramic insulator. There is a side electrode fastened to the spark plug shell which grounds on the cylinder head. A high-tension wire from the distributor is attached to the top of the center electrode.

At specifically timed intervals, current flows from the distributor, down the center electrode, jumping the gap to the side electrode, and thus producing a spark which ignites the fuel-air mixture in the combustion chamber.

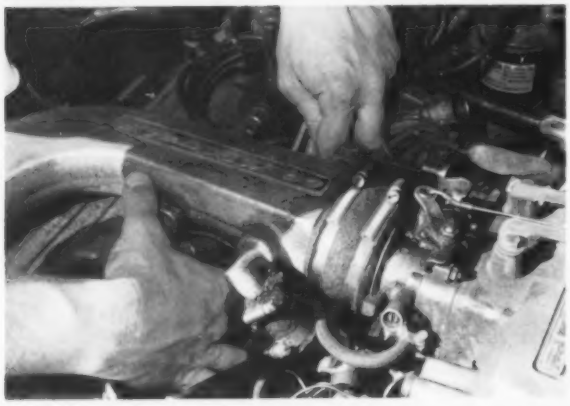
Most of the spark plugs have a 14 mm thread diameter although some have 18 mm and a very few have 10 mm. These sizes when expressed in inches are respectively 0.55, 0.71 and 0.40.

The atmosphere within which the spark plug operates can be determined by simply removing the plug and reading the firing end. When compared to a new spark plug, the firing end will have changed color and may be coated or encrusted with a variety of compounds.

Spark plugs are made in several heat ranges. The term heat range refers to the temperature scale within which the spark plug operates.

The spark plug must transfer heat from its firing tip to the cylinder head and into the coolant. If it doesn't transfer enough

continued



Label the wires as you remove them from the plugs so that they can be reconnected to the right cylinders. A piece of numbered masking tape on each wire, starting from the front of the engine, is a good way to do this.

Before removing a spark plug, carefully blow any dirt out of the spark plug well. This will keep dirt from falling into the combustion chamber when the plug is removed. Use compressed air, a tire pump or a straw to do this.

(left)
Use a spark plug socket to remove the old plugs. The plugs will seem tight, but they loosen suddenly, so be ready for them to "give" or you may skin your knuckles.

heat the center electrode will be melted or eroded by the hot flame, or the insulator damaged by excessive temperature. On the other hand, if the plug transfers too much heat away, the insulator will become fouled with carbon and baked oil.

The rate of heat transfer basically depends on the length of the insulator nose. A "cold" plug has a short nose and transfers heat rapidly. By comparison, a "hot" plug has a long insulator and transfers heat slowly.

Normal heat range spark plugs are for average driving (about 40 percent city and 60 percent highway). However, your driving needs may be different.

For example, if most of your driving is in cities, at slow speeds with lots of stopping and going, the operating temperatures will be low and a hotter plug might serve your engine better. However, the same car operated mainly at high speeds over long distance might get better results from a colder plug because the operating temperatures will be higher.

A cold plug will start to foul when operated at low speed. On the other hand, a hot plug will not foul at low speeds, but if it is operated for any length of time at high speeds, the tip and electrode will be ruined.

Typical temperature readings are:

- Normal plugs run from 600 degrees Fahrenheit at idle to about 1,500 degrees at full throttle.
- Hot plugs run from about 750 degrees at idle to over 1,800 at full throttle.
- Cold plugs from 400 at idle to just below 1,000 at full throttle.

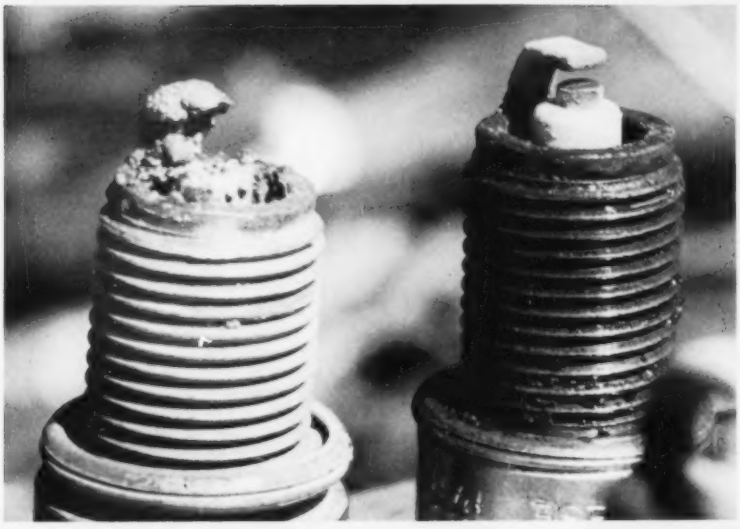
Carbon and oil fouling occur below 600 degrees, while electrode burning and corrosion start at about 1,500 degrees with preignition at 1,700.

(Note that a spark plug is exposed to the intense heat of combustion which may exceed 4,000 degrees at the beginning of each power stroke on open throttle.)

To judge how the spark plugs and each cylinder are performing, remove the plugs and examine the firing tip.

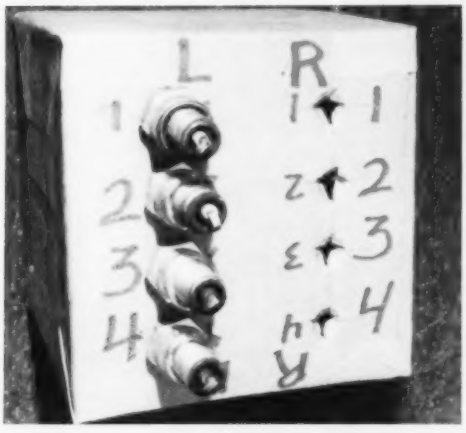
When a plug has been operating normally for a short time, the insulator nose will have a soft, grayish tan powdery deposit with slight electrode wear. A plug that has been operating normally for a long time will have the same appearance, except that the deposits will be heavier with slightly more electrode wear. A normally operating plug may also have dull, rusty appearing deposits.

Badly blistered and fused deposits on the insulator nose with excessive elec-



Guess which plug wasn't tightened properly.

Normal plugs will have a light tan or grey coloring of the insulator at the firing tip.



Keep the old spark plugs in order so any abnormal condition on the firing end can be easily traced to the faulty cylinder. Simple holes punched in a cardboard box and numbered will do just as well as drilling ½-inch holes on 1½ inch centers in a nine-inch section of two-by-four.

trode erosion indicate prolonged operation under extremely severe conditions. Such cases call for a plug that is one to two heat ranges cooler.

In the early stages of overheating, the insulator will be white with dark spots near the tip. If you find such a plug (or plugs), reinstall it (them) and then remove and reinspect the plug(s) after a few more hours of operation. If the condition has worsened, install a cooler plug.

If the condition has not worsened, the plug was probably not tightened properly when it was originally installed.

A dull black film of carbon will develop on the nose and exposed shell of a plug that has been running too cool for a short period of time. This sooty appearance can build into a black accumulation of oil and carbon that almost fills the area between the insulator and shell over extended use.

continued

Always use a round wire feeler gauge/tool to gap the new spark plugs to specifications found on the underhood label, in the owner's manual or tune-up guide. Flat feeler gauges cannot give an accurate gap measurement between the electrodes.

Plugs that are running too cool seldom show electrode wear.

A wet, shiny black deposit all over the firing end of the plug indicates the engine combustion chamber is consuming oil badly. A hotter spark plug will help engine performance until the oil pumping problem can be cured.

Dry, fluffy black deposits indicate gas-fouling which results from the mixture being too rich. Gas-fouling can also result from a weak ignition system. This includes spark plugs that are too cold or worn out.

Bending the center electrode when gapping a spark plug can result in a broken insulator. However, this type of damage can also occur when the plug is too hot. Of course, the first step to avoiding a broken insulator is to gap the plug by bending the side electrode only.

There's another common spark plug problem that is not caused by engine conditions: a broken upper insulator. Such damage is always the result of an outside blow, usually from a poorly fitting wrench used during installation or removal of the spark plug.

Although a broken insulator may not misfire immediately, as soon as oil or moisture gets into the break, the spark plug will misfire. Although you may not actually see the crack, you can often see and hear the results. There will be a small flash from the crack that also sounds like a cracking snap.

Be sure to keep the spark plugs in order so you can interpret the clues for the proper cylinders.

To adjust the gap, bend the side electrode only.

The wire gauge must just pass between point and electrode.

Always use deep socket wrenches manufactured by a high grade tool company.

Spark plug socket wrenches often fit too loosely around the spark plug hex and may result in damage to the plug.

How Tight?

Spark plugs must be properly tightened when installed.

Half of the troubles caused by overheated spark plugs are the result of the plugs being too loose in the cylinder head. If a plug is not tightened enough the contact between the plug shell and the cylinder head will retard the flow of heat from the spark plug to the water jacket. An incomplete seal will allow gases to leak by. This produces spark plug overheating, preignition, burning of insulator, rapid wearing of the electrodes and leakage.

Over-tightening a spark plug increases the spark gap and distorts the gasket, causing compression blow-by. Over tightening will also often cause a fracture in the plug shell, stretch or strip threads, or crack an insulator.

To properly tighten spark plugs you spin them into the cylinder head by hand until each is finger tight. Then place a socket wrench over the plug. If the spark plug is a gasket type, give it a one-half turn. That's all that is necessary to create a gas-tight seal. If the plug is a tapered seat type with a gasket, it requires only a $^1/_{32}$ to $^1/_{16}$ turn of the wrench.

Always use a good quality, deep-well socket when tightening spark plugs.

Few people use a torque wrench on spark plugs since it isn't really required. But it would be a good idea if you practiced with a torque wrench a few times to determine how far a wrench must be turned to reach the recommended torque necessary to create a gas-tight seal. Tighten the plugs to the SAE lbs-ft values given here. These figures are maximums and are based on the spark plug and engine threads being clean.

	GASKET SEAT	
	CAST IRON	ALUMINUM
SIZE	HEADS	HEADS
10mm	8-12	8-12
12mm	10-18	10-18
14mm	26-30	18-22
18mm	32-38	28-34
	TAPER SEAT	
14mm	7-15	7-15
18mm	15-20	15-20

Remember, the smaller the plug size the less pull required to fully compress the gasket. Be especially careful with 10 mm plugs. To avoid damaging 10 mm plugs, don't use a wrench with a handle longer than four inches.

When tightening spark plugs in cast iron heads the engine should be at normal operating temperature. With aluminum heads, the engine should be cold (normal room temperature).

Exercise care when installing spark plugs in aluminum heads since there is a danger of stripping the threads in the cylinder head. Some manufacturers recommend using anti-seize compounds on the plug threads in aluminum cylinder heads. If a compound is used, apply it sparingly to the first two or three threads of the spark plug only. These compounds can retard heat transfer as well as reduce friction which could result in stripping the threads in the cylinder head.

Finally, always use new gaskets when installing spark plugs to assure a good tight seat.

Install the new plugs and take care not to overtighten by first spinning the plugs in finger tight.

Reinstall spark plug wires making sure terminals are pushed fully into spark plug post.

Before closing the hood, take a quick inventory of the hand tools and instruments you've been using.

Backfire LETTERS TO THE EDITORS

CORVETTES NOT IDENTICAL

This letter is in regards to the article "ABC Is Here," in the September 1985 *Driver*. The two Corvettes pictured are not identical 1986 models. The Corvette in the background (the one w/out ABS) is a 1985 model. You can tell the difference by the wheels.

Also, I wanted to let you know that you put out a great magazine, and being a Security Policeman, I really enjoyed the article, "White Door Treatment."

Sgt. Bryan C. Killian, USAF
Norton AFB CA 92409

You might be right if the photos were taken anyplace other than the G.M. Proving Grounds where you can only tell the players with a program. Both Corvettes are 1986 models.

MORE IS NOT WRONG

In the August 1985 Backfire, Mr. Scott Bartels, of AT&T proposes increasing the minimum distance to follow behind another vehicle to four seconds. He feels this is necessary because "that is the minimum amount of time needed to stop a passenger car."

What he has forgotten is it also takes four seconds for the vehicle you are following to stop! The two second spacing gives you time to react to his braking action and start yours. It also provides an allowance for the fact that the other vehicle is moving slightly slower than you are because he began slowing first. Given equal braking performance and prompt reactions, two second spacing should allow you to stop prior to impact.

There is no absolute requirement for additional seconds of spacing due to fog or rain because the other guy can't stop any faster than you can in those conditions. However, more is not wrong, it's just not required.

Capt. Robert J. Buch
Ft. Rucker AL 36362-5358

ADD A FEW MISSING THINGS

I would like to make reference to your "A Winter's Tale" article in the October 85 issue of DRIVER. First off it was very good and I'm sure useful to all our seasoned drivers. Pertaining to your "Survival Winter Kit Stuff" on page 9, I would like to add that a few things were missing.

In climates with meters of winter snow, a good survival kit should have candles, matches and a handful of candy bars. If caught in a blizzard and you can't drive, stay in your car. One candle will provide adequate heat for hours. The candy bars will keep your hunger down till help arrives or the storm clears. Periodically, dig yourself out if you have been "drifted under" and above all, don't warm your engine to provide heat. That will only be fatal. Good driving.

Sgt. John T. McBride, USAF
APO NY 09633

Fine advice. Particularly your point about not running the engine to provide heat in a stalled car. Even getting out of the car occasionally to breathe fresh air is not sufficient to offset a relatively continuous exposure to accumulating carbon monoxide.

ARE COMMENTS VALID?

Concerning the September 1985 issue's comments on following the 55 mph speed limit, are they valid? Is the increased efficiency of today's cars taken into effect? Is the cost of TIME lost figured against it? Isn't the fact that we have a 55 speed limit saying that we have worse drivers now than, say, 10 years ago? And that now, instead of enforcing safe driving laws, we are now concentrating on the speed laws. I would rather see educated, competent 65-70 mph drivers than ignorant, lazy people at 55 mph. I was extremely pleased to see that a person got a ticket for a driving violation (illegal U-Turn). We need more of this kind of enforcement. Also, can't Hi-Po's give tickets while off duty?

Now, about Mr. Gallagher's letter. I personally believe that a backrest is just one more object to dodge if you are hit or lose it, and as such is not a safety item. But aside from that, why did you not comment on his stopping in the street without checking behind himself? If you ride a bike you must be aware of traffic all AROUND you. I have missed many left turns and run a few "orange" lights to be safe from cars behind me. I would have risked a bent rim rather than the consequences he suffered. I'm also a little curious to know if he knew how to counter-steer.

I've enjoyed *Driver* for a long time, before I got my learner's permit in fact, and would like to say thanks for the info.

SSgt. James Rumage, USAF
Arlington TX 76010

We are inclined to believe the 55 mph speed limit contributed to the decline in traffic deaths the U.S. has experienced in the past few years. But there are convincing arguments from other directions, such as reduced driving by very young motorists who are most vulnerable to accidents and most affected by a tight economy. Sorry to say, traffic fatalities increased in the first part of 1985; this is being attributed to increased driving.

NOT ADEQUATE PROGRAM

Driver, Oct 85, page 28, the letter titled "Keep Young Warriors Off the Concrete." I totally agree with SSgt. Schwehr that the base Defensive Driver's Course for Cycles is not a very adequate program. Most insurance would not accept my Army safety course in order to get a 10% discount. The insurance companies want an AMA or MSF backed safety course to secure a 10% discount; I totally agree, the base course is usually taught by an E-6 or E-7 who knows nothing about motorcycles. Let's get the AMA and MSF into the military MDDC course or get rid of the course.

Motorcyclists need a good safety course and a controlled area to practice necessary evasive riding techniques. Have you ever tried to explain to an MP that you were going 60 mph on this obscure back road in order to practice front-wheel hard braking?

SP/4 Mark Schmitt
Hunter AAF GA

MORE ENTICING THAN INSIDE OF COFFIN

This is in response to the letter "Stop Passing the Blame" in July 85 Backfire.

No one enjoys assessing blame for any mishap — especially when the burden for

responsibility lies with the deceased. Realistically, blame becomes unimportant when an injury or fatality occurs. However, reluctance to accept driver responsibility causes mishaps — somewhere — everyday. The author states he/she has been in several mishaps, but still wishes to drive with a carefree attitude. To him/her I say, visit your local cemetery and you'll find thousands of *carefree* drivers! A carefree attitude is absolutely the worst attribute a driver could have — unless of course he/she believes in DWI also. What really counts is how well motorcycle operators accept and cope with the rules of the asphalt jungle. Simply stated, they cannot compete with cars and trucks; you must acknowledge this to survive.

Now to set the record straight for "who's to blame." A review of the Military Airlift Command (MAC) motorcycle mishaps for 1984 and 1985 shows motorcycle operators at fault in 121 of 156 mishaps or 78 percent of the time. Further, 80 of those 156 were *single vehicle* mishaps. In other words, 50 percent of the time, motorcyclists didn't even have another operator to possibly blame. Those are facts, not assumptions!

So, to the author, I ask you to change your attitude to *defensive* driving. A helmet, long pants, gloves, boots, rear view mirrors, professional training and defensive driving techniques may not look carefree; however, I believe they are more enticing than the inside of a coffin.

CMSgt. Raymond D. Ulrich, USAF
Scott AFB IL

SIGH, NOT AGAIN

I'm not sure where to start! I've been reading *Driver* for about as long as I've been in the service, 11 years, and I just can't take it any longer. The subject is motorcycles (sigh, not again).

A little background: I'm 29 years old, I've been riding for 16 years. I started out on a Honda 70 at 13 and have worked my way through the motorcycle spectrum to my present ride, a Harley Davidson FLH80 (that's 1340 cc's). I've had one moving violation (seven years ago) and one minor accident (on the back of a friend's bike). Neither were alcohol related. I feel I ride cautiously and safely.

Over the years I've seen articles and letters, pro and con, in your magazine about motorcycles, but when I paged through your July 1985 issue there was an article from MSgt. Donald R. Petron, McClellan AFB, Calif. That was a sigh of relief, to think someone feels the same way I do. A hearty "Bravo Zulu" to you in voicing "our" thoughts. Mr. Petron, I agree with you 100%.

Then I read on to the letters section. One heading caught my eye, "Stay Away From Motorcycles," from SSgt. Frank Zenda, Yokota AB, Japan. Well, Frank, you do that. Stay away from them. Turn in your keys and walk. Every man has his right to his opinion, that's why I'm writing and that's why you wrote. But I'm not an ordained minister and I don't "preach" to anybody to ride or not ride, as you did. It's people with your frame of mind that scare the hell out of me when I'm out on the road. I've seen your type, your beady little eyes in the rear view mirror, waiting for a chance to dust a biker. Well if it happens to me, and it just might, I'm coming back as a ghost with a wrench and your car will never be the same.

SS2 Wayne L. Arnold, USCG
Corpus Christi TX 78362

TWO WHEELS HERE LONGER THAN FOUR WHEELS

I just found a copy of your July *Driver* Magazine and read the letter written by SSgt. Zenda from Yokota AB, Japan. I agree with him on one point, and that is that automobile drivers should drive safely and *stay away* from motorcyclists. I have been riding only 18 months and cannot count the times four wheeled vehicles have tried to intimidate me with their size and power. I have washed enough antifreeze from the back of my bike and clothes to fill the radiator of a Mack truck. An exaggeration perhaps, but the fact is that motorcycle riders are considered fair game by many automobile and truck drivers.

I also had a low regard for bikes and riders until I attended a Motorcycle Riders Course. The course is presented by the Motorcycle Safety Foundation and it was not mandatory that I attend. Having ridden 10 speed bicycles most of my life, I felt I might be able to learn something new while experiencing the same training my subordinates do. The course content, its presentation, and the hands-on experience from this week-long class showed me that it is no more hazardous riding a motorcycle than it is driving a car. Granted, a rider must be more alert than a driver, but if all the safety rules are observed by *all* operators, problems would not arise. While it is true that death is final, fault and repercussions should be levied on the responsible party, be it rider or driver.

Motorcycles are being bought in increasing numbers, but the ratio of accidents still does not even come close to that of automobiles. For every motorcycle accident report published in your magazine, I usually read seven or eight automobile reports.

As a member of a democratic society, SSgt. Zenda is entitled to his opinion. So are the rest of us and if an individual chooses to buy a bike, it is his decision. After all, two-wheeled transportation has been here a lot longer than four-wheeled.

An Enlightened Car Driver

MUST HAVE SEAT BELT LAW

I just finished reading "True Accidents" in the latest Driver. Some of the accidents sounded pretty gruesome. I have seen the worst accidents that you can imagine. I am active duty Navy and I am also a certified Emergency Medical Technician in the state of South Carolina. As an E.M.T., I have seen what happens to drivers who did or didn't wear their seat belts, and believe me, it's better to wear them! The drivers who drink usually are the ones who end up killing or maiming someone, yet they just get thrown in jail, while someone innocent suffers.

We must have a mandatory seat belt law, with a fine for failure to wear them.

OM1/SS Corrao
FPO Miami FL 34092-2366

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AUTO FACTS

Rx for NO START CAR CARE

THE AMERICAN AUTOMOBILE ASSOCIATION BLAMES "BATTERY OR ELECTRICAL FAILURES" FOR THE MAJORITY OF STARTING FAILURES AND EMERGENCY ROAD-SERVICE CALLS.

BEFORE A NO-START RUINS YOUR DAY, GET A TUNEUP AND ELECTRICAL CHECK.

car care council